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ABSTRACT

Two studies were conducted during 1973-1974 on a number of comic book styles as viewed by children classified as good, poor, and functionally illiterate readers. Subjects were exposed to a wide range of formats and reading difficulty in comic book slides, and their eye movement was observed and recorded. Results showed that good readers systematically attacked each frame regardless of format or content; however, poor readers displayed irratic eye movement and were quickly discouraged by large blocks of print. A number of possible improvements have been suggested to make comic book print more appealing to poor readers, and these suggestions will be implemented and evaluated in a future research study. (EMH)

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SUMMARY OF RESEARCH FINDINGS FOR CHILDREN'S TELEVISION WORKSHOP

Prepared by: K.G. O'Bryan, O.I.S.E.

The studies were corducted during 1973-1974 on a number of comic book presentation styles as viewed by children classified as good, poor, and functionally illiterate "readers".

The methodology consisted of the preparation of slides of single pages from a variety of comic books containing a wide range of action-to-print variability, different modes of print presentation, different levels or complexity of art work, different degrees of vocabulary difficulty and a range of subject matter. The original study was followed by others for validation and for specific reference to Spidey Super Stories.

The purpose of the studies was to define some parameters of the children's viewing strategies as they related to attempts to read the pages in question. A Mackworth Line-of-Sight Eyemovement Recorder (Polymetrics) was used to record corneally reflected eye movement patterns which were then photographed at 10 frames per second on 16mm movie film. All scoring was hand done on overlays of the actual comic book page and computations were made on the basis of real-time viewing patterns. This procedure was followed for all subsequent studies.

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The subjects chosen for the research were drawn from the Toronto area and were pretested on a series of standard reading tests matched to teachers' assessments. Because of the expense and complexity of eyemovement research, the numbers of subjects were usually restricted to 15 in each cell of each study. This is quite sufficient to provide reliable results however, especially when they are replicated. Nevertheless, it would have been valuable to have had the resources to test larger numbers, especially in the poor readers category.

All research was conducted in the laboratories of the Ontario Institute for Studies in Education and is the joint effort of the author, Harry Silverman, Ruth Badanes, and Karen Mock.

RESULTS:

Study 1

The original study was a fact-finding formative research effort directed at establishing basic guidelines for the development of the most effective comic book layout and content possible for poor readers. The summary which follows touches only on the more significant findings of those reported in meetings at C.T.W. Previous research reports of study 1 are on file at C.T.W. and O.I.S.E. and are available on request.

Essentially, the following major points were noted in Study 1.

(i) Whenever good readers were shown a comic book page, they inevitably read all the words, usually before they made a close examination of the artwork and often in integration with salient features of the art work. By contrast, poor readers almost always were attracted to the art work first and rarely attempted an extended effort to read the print, while the functional illiterates never made more than cursory efforts to read. In fact, they appeared to actively avoid print, especially when it was presented to them in large chunks.

(ii) Good readers displayed a systematic reading pattern easily discernible in the movie records. They consistently read from left to right in the planned order of arranged sequences and quite often referred to key elements in the artistic layout as they read cues in the print. By sharp contrast, poor readers' eye movement patterns displayed generally naphazard attack with many more

off-stimulus fixations and random attention to order of planned print. Functionally illiterate subjects rarely displayed anything but random, unsystematic viewing patterns and even appeared to have difficulty in examining pictures. Apparently, the functionally illiterate has problems in viewing any visual display even when print is at a minimum. It is unlikely, therefore, that the illiterate will be helped by comic strip or book presentation without very extensive rethinking of presentation modes.

(iii) Print presentation variables were clearly important factors. In brief, our findings from Study 1 indicated that: (a) Blocks of print should be avoided as much as possible since this mass of print tended to overwhelm the eyemovement patterns of the poor readers. (b) Where blocks were used, it was apparent that they should be short in number of included words, well spaced and very clearly printed. (c) Balloons were easily the most effective means of generating looking behaviour approximating reading patterns among

the poorer readers. Several balloon formats were examined and results indicated that balloons with jagged edges induced higher degrees of eyemovement concentration. That is, the children looked at this type of balloon format most often. "Think balloons" also had a very high attention-getting power. Square or rectangular balloons were less effective and multiple balloons, beyond two to a frame, were very often confusing to the poor readers and appeared to have strong negative effects on reading efforts. In short, balloons are better than blocks of print and balloons with emphasis edges always attract higher eye movement fixations than standard or square balloons. This is probably the result of their novelty level or impact potential and they therefore might be valuable to introduce new words or more difficult words and sentences. In all likelihood, their value would diminish were they used exclusively, therefore we recommend that balloons be used

before blocks (which should be avoided as much as possible) and that special impact balloons be reserved for the key educational tasks in the comic. (d) Print size appears to be a relevant variable not so much in terms of absolute size as in the variability of size and intensity. Our data suggest that clearly printed, moderately large well spaced words are desirable in general, but that variation in print-size is more important. If the key thought, word or intention is presented in larger, higher-intensity (thicker) print than the rest of the sentence, there is clear evidence in Study 1 that this will substantially increase the looking behaviour of poor readers at the print in question. This is not to say they will necessarily read it (although later studies indicate that this is so) but they certainly will look at it. This finding applies to both balloons and print, and has been replicated in later research. (e) Amount of print per frame. Good readers tolerate almost any amount of print per

frame and in fact, seem to enjoy the comic book more if it contains substantial amounts of print. This is definitely not the case for poor readers who rapidly give up on print-loaded frames. They give a cursory glance at the art work and turn to the next stimulus. By-and-large, more than ten words to a frame appeared to produce a definite turn-off and more than two balloons produced the same effect. It was better to have the balloons very clearly attached to the speaker involved and to avoid complexity in their arrangement. This was not so for good readers who seemed, rather, to enjoy such complexity. When the arrangement of balloons and boxes and complexity of print are considered together, the following general principles appear to be valid: Print should be kept to less than ten words per balloon or box; if multiple balloons are used the amount of print in them should also be reduced; balloons should be very clearly attached to their speaker, and boxes should contain as

few words as possible. (f) Relationship of words to action. The most striking feature of the results was the way in which many children were able to avoid the necessity of reading by being able to invent stories (often very much like the original) from examination of the pictures alone. This is a very serious problem for the comic book writer and we offer some suggestions with caution:

The pictures should be interesting in themselves but the continuity between them should not be too explicit. In other words, our data have some indications that children will attempt to read when they need the information to establish the story-line. If the story-line can be integrated with the pictures so that it (the print) is dominant, the chances of it being read are likely to be much increased. Here, the use of "flash" balloons may be most important as these definitely catch the eye movements of all groups. The key story-line could be carried in the flash balloons provided they

are reasonably sparingly used to avoid habituation. Another indication in the data suggests that leads from one frame to the next may be useful, that is, continuation of the sentence from one frame to the next. This should, however, be sparingly used and will probably work best in cases where the difficulty level of the material is low. (g) Wherever possible, print should be positioned at the eye or mouth level of the speaker and boxes should be in the upper part of the frame. The data indicate much higher intensity of fixation patterns under these conditions than is the case when boxes are placed at the bottom of the frame. (h) Types of art work: Action art work of moderate to low complexity was the best "read" by the poor readers. In all the examples studied, the Spiderman type of strongly outlined, vigorous drawing appeared to develop most interest and to create the highest degree of eyemovement. If the frame is oversimplified, little activity is generated and very few fixations

occur. If the frame is overloaded with characters and with highly complex activity, it is very much read by the good reader but it appears to overwhelm the poor reader who generates very low quality search strategies for information and who almost invariably avoids the print.

In conclustion to Study 1, it is noted that many of these variables were retested by Badanes (1974) and that they generally replicated well. She also noted that the combination of simple print and simple action worked best for poor readers. Badanes' study was conducted with more difficult stimuli than the first research and she found that reading fixations in balloons were almost double that in boxes when simple print was used. When difficulty levels were high the poor reader scarcely attempted to read at all and therefore no differences were found in print borders.

Study 2

A limited study was undertaken to examine eye movements on the first edition of "Spidey Super Stories". In total, 30 children were tested over a period of two months. Ten of these children were good readers and were used as a quasi-control group to provide a model of the

skilled reader's approach to the first edition of the comic. The remaining children were evenly divided between boys and girls aged between 9 years, 4 months and 11 years. All were classified as poor readers by their teachers, and each was reading at least 1 1/2 grades below placement. All were drawn from remedial reading classes in the Toronto area and tested in the O.I.S.E. laboratory on actual slide mounts of the first edition. In summary, the following results were obtained.

1. Good readers reported a thorough enjoyment of the comic and read each page fully and very quickly. Their eyemovement patterns were consistent with those of very skilled readers and they encountered no difficulty with either text, story-line or artwork.
2. Poor readers displayed marked improvement in many aspects of their reading from comic books insofar as fixation patterns were concerned. Most notable of these were as follows:
   (a) Higher intensity of fixations on the print, especially print inside balloons.
   (b) More systematic attempts of a reading type. Clearly the simplified print and simple story-line effect found by Badanes was confirmed in the first edition reading patterns. The data

suggest that poor readers, when not overwhelmed by either highly complex art action or by too advanced textual material, will directly attempt to read the print. This is especially the case when Spideyman speaks so that there appears to be identification of the primary character in the segment and an attempt to understand his utterances. It would be encouraging to the creators of Spidey Super Stories to note that there was much less "turn-off" found in their comic books than was apparent in the previous study or on comparisons in the current study made on the prior stimuli. In effect, there is evidence that Spidey Super Stories is succeeding on the first educational count, that of getting the children to look with greater favour on the printed word. Success of the comic book as an entertainment vehicle will of course be measured by the more precise instrument of total sales.

(c) An interesting change in eye movement patterns occurring as children examined the artwork was noted. The subjects were more inclined to look from the print to the speaker or to the salient action described by the print. This may suggest

a degree of increased comprehension of the print and a heightened awareness of the relationship of print to picture. It is in marked contrast to earlier findings in which the poor readers rarely, if ever, returned to the print after they had left it, either in a systematic or unsystematic fashion.

(d) The big frame approach appeared to be highly acceptable and there was more activity apparent in general viewing of the whole frame. When very small frames appeared, as in the story "Spidey Signs Up", there was evidence of greater distress among poor readers. It would appear that the aversive effect of reading failure is pervasive, even to comic books, and that every care needs to be taken to avoid laying stress on the already distressed reader.

(e) Follow-up questions produced a high degree of support for "Spidey Super Stories" from poor readers. Almost a third claimed it was the first time they had liked "reading" a comic book, although almost all regularly bought comic books. This is rather interesting in that two thirds of the children were clearly incapable of reading the print in their favored comics (Spiderman, Archie, Westerns, etc.).

Some negative findings were apparent in the results. The small print size and low variability of print intensity appeared to trouble some poor readers as did the small frames found in large numbers on some pages. It was notable in the data that children in the poor-reader group declined in reading eyemovements much more quickly on the small print than on the large print. Furthermore, there were clear data that compact print in boxes was the least successful of all print presentations. When, however, print in balloons was multi-colored and multi-sized, reading-type eyemovements were markedly increased. This also was the case for all think and flash balloons.

There was an initial problem in the first edition caused by the very intensive and solidly packed print on the first story page. Much of this was the copyright information but it had a marked negative effect on poor readers which could explain a generally poor attack apparent early in the story. Indeed, the worst page in the entire production was the first story page, which was cluttered, complex and over-printed.

Other than the difficulty referred to above, there is cause for confidence in the progress made in the design of "Spidey Super Stories". It is markedly

better than its predecessors and it has generated legitimate reading-type eyemovement patterns in poor readers.

Study 3

Study 3 is in progress and has been delayed somewhat by equipment difficulties which have now been overcome. In this study Edition #2 in total, is being examined on a small sample of poor readers in direct comparison to other comic books. This study is the first truly experimental attempt to test the hypotheses generated in the formative research described above. When completed, Study 3 will examine the eyemovement patterns of thirty poor readers (15 boys and 15 girls) on the "Spidey Super Stories" and will provide firmer experimental evidence of the effect of the suggested changes noted above.

Preliminary results suggest that this is an excellent comic. The better print size, the change of stimulus patterns and the high degree of integration between picture and print all show very good directional effects. It is expected that the study will show that a major advance in educational comic book development has been achieved. Nevertheless, something must be done about the first story-line page which remains a genuine turn-off to all poor readers.